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ABSTRACT

The purpose of this study was to determine factors affecting satisfaction of Mexican American (MA) and American Indian (AI) students with their doctoral programs. Faculty mentoring plays an extremely significant role in minority education. Previous research indicates differences between males and females in their interaction with faculty. Minority students, especially Mexican Americans and American Indians, are underrepresented among annual doctoral recipients. In this study, 214 MA and AI students attending 6 universities in 5 southwestern states were surveyed, with an overall response rate of 90.9 percent. Background characteristics were compared among four groups: MA and AI male and female students, based on analysis of variance. Principal components factor analysis identified 21 factors underlying 190 variables. Nine of the factors (42.9%) pertained to aspects of faculty mentoring. The two ethnic groups responded similarly on nearly all variables. There were, however, sharply contrasting responses between women and men. Although women excelled academically over men, they were more likely to report unsatisfactory academic experiences and low academic self-concept and to view their institutions as discriminatory. The results suggest that MA and AI doctoral students' feelings of belonging can be greatly facilitated or deterred by their faculty mentors. Lack of concern for these students by nonethnic faculty contributes to their sense of isolation. MA and AI doctoral students should have the opportunity to work with ethic-minority faculty and with mentors of their own gender. (Contains 36 references.) (TES)

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MENTORING FACTORS IN DOCTORAL PROGRAMS OF MEXICAN AMERICAN AND AMERICAN INDIAN STUDENTS

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ABSTRACT

The purpose of this study was to determine factors underlying satisfaction of Mexican American and American Indian students with their doctoral program. The two ethnic groups responded similarly on nearly all variables, but there were sharply contrasting responses between women and men. The conceptual framework and questionnaire used by Nettles in his pioneering study of other ethnic minority doctoral students was used to gather data from 214 students in six Southwestern universities in five contiguous states. The overall response rate was 90.9%. Principal Components Factor Analysis was used to identify 21 factors underlying satisfaction with doctoral programs. Nine of the factors (42.9%) pertained to aspects of faculty mentoring. Data from this study are compelling in their support of Mexican American and American Indian doctoral students having the opportunity to work with ethnic minority faculty, and even more dramatically, with mentors of their own gender.

MENTORING FACTORS IN DOCTORAL PROGRAMS OF MEXICAN AMERICAN AND AMERICAN INDIAN STUDENTS

Madeline J. Williamson and Robert H. Fenske

Introduction

Graduate study is a period where professors ideally play a key role in helping students develop a professional identity and become socialized as a member of their chosen profession. Results of this study demonstrated the strong influence of doctoral mentors on this process and the special benefits provided by mentors of like gender and ethnicity to these Mexican American (MA) and American Indian (AI) students.

The ultimate goal of this study was to contribute knowledge that can lead to institutional efforts to increase production of minority doctorates. This study extends the Nettles (1989a, 1989b, 1990) data base on ethnic minority doctoral students by collecting the first such comparable data on MA and AI doctoral students. A major goal of this study was to investigate factors which enhance satisfaction among MA and AI doctoral students as well as factors which prove to be barriers to such satisfaction.

Data collected through the federal Integrated Postsecondary Education Data System suggest that all racial/ethnic minority groups were at, or very near, their all-time highs of graduate enrollments in 1986. The question remains whether that "all time high" begins to approach a level adequate to furnish the pool of minority doctorates needed to significantly increase minority representation among university faculty and in leadership and policy-making positions in society.

Rationale for the Present Study

The production of a greater number of minority doctorates is one of the major policy issues in higher education. Minority doctorates represent future faculty who are the key role models to undergraduate minority students, who may in turn go to graduate school and become future faculty. One of the most significant aspects of this process is faculty mentoring. A large number of impending retirements will impact the academic labor force through the remainder of this century: Approximately half of the existing professorial positions are now held by persons within 15 years of usual retirement age (Adams, 1988; Mooney, 1990). Underrepresented minority students may not be able to take full advantage of this favorable climate due to their continuing underrepresentation among annual doctoral recipients. If this situation is to be rectified, universities with doctoral programs must play

the major role in identification, enrollment and degree attainment of minority doctoral students.

Little research has been conducted on factors determining satisfaction of ethnic minority students with their doctoral programs. Nettles (1989b) produced the first significant data base on ethnic minority doctoral students and their academic achievement. He developed the Nettles Doctoral Student Survey of Programs and Experiences (DSS) for the purpose of providing baseline data and information describing backgrounds, educational preparation, experiences, and performance of minority students in doctoral programs. The Nettles DSS was administered to 1,286 African American (AFA), Hispanic/Puerto Rican (H/PR), and White/Non-Hispanic (W/NH) doctoral students, at four major Eastern research universities with a 74.1% response rate (Nettles, 1989a, p. 12).

However, Nettles' Hispanic respondents constituted only 10.3% of the ethnic minority respondents, with the Nettles Hispanic doctoral students predominantly (and possibly, all) Puerto Rican (Clague, 1990, p. 4; Nettles, 1989a, p. 24; 1990, p. 6; Olivas, 1990, p. 7). Nettles acknowledged that outcomes could be quite different if Mexican Americans, Cubans, and other Hispanics had been represented (Nettles, 1989a, p. 24; 1989b, p. 15; 1990, p. 6). There remains a need for comparable data on other minority groups and for more intensive examination of the determinants of minority doctoral student satisfaction based on the Nettles conceptual model (1990). The Nettles study also did not differentiate analyses on the basis of gender, a frequently ignored area of minority research in all but a few studies (Chacón, Cohen, and Strover, 1987; Nora and Rendón, 1990).

Literature Review

Demographics

Despite recent slight gains, Hispanic Americans (HAs) and American Indians (AIs) remain severely underrepresented in graduate enrollments. In 1988, HA groups constituted just 2.6% (N = 594) of all 23,079 doctoral degrees awarded (National Research Council [NRC], 1989). The percentage of AI doctorates has historically been so small that most studies have not provided separate data on their specific representation. However, the NRC's recent report indicated that AIs received 93, or only 0.4%, of all earned doctorates in 1988 (NRC, 1989).

Underrepresentation in the doctoral ranks is particularly severe for the two cohorts of this study: MAs and AIs. The number of doctorates earned by AIs actually declined by two from 1976 to 1986 (National Center for Educational Statistics [NCES], 1989). Rarely are data on AIs reported in any category except "other," especially at the graduate level of study where the number of AI doctoral enrollees nationally would barely fill one lecture hall. Significant to graduate enrollment trends for the AI cohort, more than 50% of AI graduate students are women, with their rate of enrollment having grown by 28% (more than twice that of AI men) during the four year period of 1980 through 1984 (Fries, 1987, p. 21).

Although HAs proportionate representation in both the general and undergraduate student population swelled, HAs were awarded only 72 more doctorates in 1988-1989 than they received 12 years previously (NCES, 1990). When one further disaggregates the HA cohort into its major components of ethnic origin (Cuban, Puerto Rican, Mexican American), the fastest growing and largest of that group--Mexican Americans--received but 0.6% of total national doctorates with other HAs receiving 2.0% (NCES, 1989).

Mexican American doctoral students have been subsumed under the generic title of "Hispanic" in countless studies, both nationally and institutionally. MAs constitute the majority Hispanic population of the Southwest, have played a significant role in its history and development, and will be essential to its future and vitality as their numbers and proportional representation in its general population continue to increase. It is critical--and absolutely essential in order to avoid mischaracterization or incompleteness of the problem--that MAs be disaggregated from other Hispanic cohorts in all research efforts, and that a valid data base be developed which complements comparable data on other minority doctoral students. Development of such a data base is essential for an accurate view of the problem, and for a valid interpretation of the MA and AI doctoral program experience.

Gender Considerations

Though not frequently cited in connection with minority doctoral achievement research, H. Astin's (1969) early work on gender discrepancies in the doctorate raised the kinds of questions that would later need to be addressed concerning the discrepancies between majority and minority achievement at the doctoral level.

H. Astin's (1969) insights into obstacles in the career development of the woman doctorate revealed many barriers to achievement which have had corollary application to the examination of MA and AI doctoral satisfaction some 23 years later: (a) conscious and unconscious discrimination in selection for employment; (b) discrimination with respect to graduate school admission; (c) lack of encouragement to enter certain fields, especially scientific ones; (d) differential policies regarding tenure, seniority, and promotion; (e) feelings of isolation; (f) unwillingness on the part of employers to delegate administrative responsibility and authority; (g) forced and lengthy interruptions in the doctoral work; (h) salary differentials in comparison to white males; and (i) great economic cost to the family unit in pursuing the doctorate (pp. 100-106). Also noteworthy in comparison to later minority studies, H. Astin found that close proximity to the doctoral institution was related to the tendency for degree attainment to actually take longer. This finding suggested that women who were place-bound in their doctoral institutions were more likely to carry heavy family and professional obligations while trying to pursue their doctoral studies. Data from this study strongly support this finding for the MA and AI doctoral students of both genders.

Differences between females and males in interaction with faculty has been addressed by several researchers. Blaska (1976) found that faculty members were perceived to be more influential in the lives of graduate students than were counselors, being second in

influence over students next to parents. For women, faculty were more influential than either family or peers (p. 174). Further, Blaska showed that male faculty accepted white males as apprentices and junior colleagues, but tended to exclude women from those relationships.

Holstrum and Holstrum's (1974) study found that faculty were less likely to be perceived as having positive attitudes towards women, were less available to women doctoral students, and were less likely to take women doctoral students seriously. Kjerulff and Blood (1973) addressed communication differences between men and women with the results that male doctoral students had more discussion with their research advisors, with women doctoral students having much less egalitarian interaction between themselves and male faculty.

In her dissertation study of 281 women who received their doctorates from Auburn University between 1971-1977, Rice (1981) provided a profile of female doctoral persisters which identified that the most significant factors for completion of the doctorate were support of significant others, age, and freedom from financial worry. She also found that women were more likely to drop out than men, that both sexes were less likely to complete in the fields of humanities and social sciences than in the physical sciences, and that completion time was longer for women than men.

Berg and Ferber's study (1983) found that respondents established close professional relationships most often with faculty of the same sex, and concluded that when the percentage of students who are women is more than three times the percentage of the faculty who are women, a potential problem is created by such disproportionate imbalance (p. 631). Also, the positive effect of women faculty as role models for female doctoral students might be stronger if women faculty were more often of higher rank and thereby perceived by students to be more successful (Shapiro, Hazeltine, and Rowe, 1980).

Mentoring Relationships

Several studies found that graduate students and graduate degree recipients perceive their relationship with faculty and their mentor to be the single most important aspect of their completion of their graduate degree (Arce and Manning, 1984; Blackwell, 1983; Girves and Wemmerus, 1988; Hartnett, 1976). Girves and Wemmerus (1988) found that the effect of the faculty mentor mediated the effect of undergraduate grades or quality of undergraduate institution and found the relationship between the student and faculty as the key element distinguishing graduate (doctoral) from undergraduate study. Students with the greatest amount of faculty interaction made the surest and quickest progress. At the doctoral level department characteristics and student perceptions of the faculty contributed to degree progress more significantly than one's involvement with program (1988, p. 180). Hall and Allen (1982) found that students' perceptions of greater opportunities for establishing the mentor relationship were influential in raising their achievement levels. Hearn (1987) found

that senior women had aspirations for graduate work less influenced by academic performance and major department, but more influenced by parental supportiveness.

In their study of ethnic minority students' alienation, Loo and Rolison (1986) found that a positive student/faculty relationship and satisfaction with the academic quality served as a counterbalance to feelings of academic unpreparedness, isolation, and sociocultural alienation (p. 66). However, ethnic minority faculty in two-year colleges in the five Southwestern states of interest (Arizona, California, Colorado, New Mexico, and Texas), are represented in proportions far below their representation in the general population of the state, and are even less well represented in the four-year colleges (American Council on Education, [ACE], 1987). New Mexico ranks the highest in both AI and HA faculty at two-year and four-year institutions: AIs constitute 1.0% of two-year faculties and 0.8% of four-year faculties in 1983-84, and HAs consitute 14.8% and 8.6%, respectively, of those faculties. The mean percentages of HA and AI faculty (3.4% and 0.5%, respectively) in the five states are twice that of the total U.S. percentages (1.3% Ha; 0.2% AI) (ACE, 1987). Clearly, ethnic minority students--both regionally and nationally--have very few ethnic minority faculty after whom to model themselves or with whom to interact personally or professionally.

As role models, ethnic minority faculty have a special and direct influence on the recruitment, retention, and future career aspirations of successive generations of minority scholars and professionals (Blackwell, 1987, Carrington and Sedlacek, 1976). Faculty role models heavily influence the interests and career goals of their students, as well as their philosophical, theoretical, and scientific views (Bernal, 1980, p. 135). Bernal's analysis of difficulties in producing minority graduate students and minority faculty in clinical psychology further posits that since 95% of faculty members are predominantly male and W/NH, graduate students are likely to learn that minority/gender-related research and curricula content are ignored (p. 135).

Method

Conceptual Framework

The Nettles Conceptual Model of Factors Related to Minority Students' Experiences and Outcomes in Their Doctoral Programs (1989b) was used in this study as the basis for investigating factors of academic satisfaction. Nettles' model is essentially a campus environment model and, given the study population, is used in the study to examine the self-perceived "fit" between these minority students and the majority environment at the top of the educational ladder. Attention was focused on relationships with mentors and advisors; comparisons with other students (both W/NH and minority); and on needs, characteristics, frustrations, and rewards of these MA and AI doctoral students.

In contrast to Nettles' conceptual approach of positing two dependent variables (Doctoral Grade Point Average and Doctoral Program Satisfaction) affected directly or

indirectly by an array of independent variables, the present study sought to determine the factorial structure of all of the data guided only by the focus on satisfaction with doctoral program. This approach was selected in order to provide a solid basis for ultimately developing a theoretical model of ethnic minority doctoral satisfaction. Analyses focused on determining the factorial structure of minority doctoral student academic satisfaction, and proceeded without *a priori* assumptions regarding parameters and vectors of such satisfaction. Determination of interrelationships among all variables for this purpose would have been unduly constrained by prior specification of some variables as independent and others as dependent. Specifically, causal relationships will be identified in a subsequent study leading to the development of a model for MA and AI doctoral students.

Data Sources

The 1989 Nettles Doctoral Student Survey of Programs and Experiences (DSS) was used as the survey instrument. The DSS contained 190 variables. Data were collected from 214 MA and AI doctoral students in six major research universities in five contiguous Southwestern states in the fall of 1989 and spring of 1990. The universities that cooperated in the study were Arizona State University, the University of Arizona, the University of California at Los Angeles (American Indian respondents only), the University of Colorado at Boulder, New Mexico State University, and Texas A & M University. The overall response rate was 90.9%. The respondents of this study represent MA and AI doctoral students on a regional, not a national, basis and they are not yet actual recipients of the doctorate. Nonetheless, they potentially represent a substantial portion of all doctorates annually awarded for their respective ethnic group. The responding AI cohort of 38 does not seem large in itself, but nationally only 93 doctorates were awarded to AIs in 1989. In the same year, 594 doctorates were awarded to HAs, but only 138 of those went to Mexican Americans. This study's MA cohort of 176 represents a significant number of potential MA doctoral recipients in the 1990s.

Procedures

Principal Components Factor Analysis was selected as the statistical design. This design was chosen to mitigate against such a large number (190) of variables. Descriptive statistics were performed for exploratory purposes on all variables; one-Way Analysis of Variance (ANOVAs) for each of the extracted factors and selected variables were given; *F*-Ratios and the *F* probability were calculated; crosstabulations for background characteristics and key findings of the respondents' doctoral experiences were given by gender and ethnicity; Chi-square and significance levels were indicated; Rotated Factors and corresponding eigenvalues for each extraction were given with both ethnic cohorts (MA and AI) divided into subgroups by ethnicity and gender; and individual factor loadings for each of the resultant factors were individually designated.

The Least Significant Differences (LSD) Procedure (Stevens, 1986) was used for pair-wise comparisons of the four ethnic/gender subgroups. A Least Significant Differences Matrix (LSDM) was created to illustrate those differences between the six possible relationships at the .10 level of significance and is illustrated in Figure 1. Each vector of the LSDM designates the four subgroups of the analyses as follows: American Indian Male: AI(M); American Indian Female: AI(F); Mexican American Male: MA(M); and Mexican American Female: MA(F). All possible pair-wise groups are designated as differing from each other in the following matrix manner:

AI(M) differs significantly from AI(F) = a;
AI(M) differs significantly from MA(M) = b;
AI(M) differs significantly from MA(F) = c;
AI(F) differs significantly from MA(M) = d;
AI(F) differs significantly from MA(F) = e;
MA(F) differs significantly from MA(M) = f.

	AI(M)	AI(F)	MA(M)	MA(F)
AI(M)	--	a	b	c
AI(F)	a	--	d	e
MA(M)	b	d	--	f
MA(F)	c	e	f	--

Note. Each letter in the matrix denotes a pair of subgroups significantly different at the .10 level.

Figure 1. Least significant differences matrix (LSDM)

For the Principal Components analysis, two separate factor analyses were performed, accounting for 67.9% and 69.4% of the variance, respectively. The analyses were performed using the method of principal factors with R^2 in the diagonal of the correlation matrix. In order to achieve a maximum separation of factors, varimax rotation (Kaiser, 1960) was performed throughout. Iteration was performed until there was no further significant increase in communality (h^2). The Kaiser (1960) criterion of retaining all factors whose eigenvalues were equal to or greater than one was used. A coefficient of reliability (Cronbach's alpha) was computed on the items used in the principal components analysis (Cronbach, 1951). Standardized tests for homogeneity of variances (Cochran's C; Bartlett-Box F; Maximum/Minimum Variance) were calculated (Pedhazur, 1982). All data were run on the SPSSX statistical package. Initial analyses revealed the unanticipated finding that significant gender differences were much more prevalent than differences between the MA and AI ethnicities. Therefore, gender was accorded equal attention with ethnicity as a basis of comparison and became an integral part of the analyses.

Summary of the Findings

Comparison with the Nettles Study

The Nettles study (1989a, 1989b, 1990) included three cohorts (AFAs, H/PRs, and W/NHs) who proved to be largely dissimilar from each other. In the present study, two ethnic cohorts--AI and MA--responded in very similar ways as verified by the Discriminant Analysis classification procedure. However, when responses from the present study were analyzed by both ethnicity and gender, strong differences occurred. Since the Nettles study did not incorporate gender differences in the analyses, comparison on gender group differences between the two studies was not possible for the separate variables. However, the factors resulting from the factor analysis were compared. Between the two studies, there were 45 factor items which were not shared, and only 30 factor items which were in common.

Background of Respondents

Mean age of the respondents was 36.4 years; standard deviations for the subgroups ranged from 6.6 for AI(F) to 8.9 years for AI(M). Fifty-seven percent of the students indicated they were married or unmarried but living with a partner and the remaining students were denoted as single (a category which included divorced and widowed). Larger percentages of females in both ethnic cohorts reported being divorced (14.8% of MA(F)s and 17.6% of AI(F)s) than either of the two male subgroups at 9.5% each. Mean number of children for these subgroups ranged from 1.88 for AI(F) to 2.09 for MA(M). Number of total dependents was somewhat larger and averaged about three for all of the subgroups. For those who were single/widowed/divorced, there was a significant difference on this item between the subgroups MA(F) and MA(M) of 2.60 and 2.09 dependents, respectively.

Nearly three-fourths (72.2%) of the total group had mothers who had less than a high school education. American Indian females had the largest percentage of mothers with some college (35.3%) and the AI(M) subgroup had the largest percentage of mothers (9.5%) with advanced degrees. The AI cohort had the largest percentage of parents with higher education, the MA cohort had mothers least likely to have a high school education, and both parents of the MA cohort were less likely than the AI cohort to have college and advanced degrees.

Significance tests resulting from ANOVA calculations on the mean response difference between gender and ethnicity categories for selected variables are given in Table 1. Significance was tested at the .10 level.

Analysis yielded a significant relationship on responses to DSS Question 67 ("spouse/partner's highest level of education") showing that MA(F)s and AI(F)s have partners with the highest educational background. The Chi-square statistic ($df(9) = 20.48$) for this variable was significant ($p = .0152$) and supports corollary ANOVA results ($F = 5.765$, $p = .0010$). The MA(F) subgroup had a remarkably high percentage (63.4) of spouse/partners with an advanced degree, followed by 40.0% of AI(F)s, 28.8% of MA(M)s, and 7.7% of AI(M)s. The ANOVA on this variable showed significant differences between MA(F)s and AI(M)s, and between MA(F)s and MA(M)s.

Table 1

One-Way ANOVA for Selected Variables

VARIABLE	MALE				FEMALE				LSD TEST*	F RATIO	F PROBABILITY
	WA		AI		WA		AI				
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD			
Age	35.56	6.96	37.05	8.92	37.59	8.16	35.11	6.62	f	2.224	.1019
Undergraduate GPA	2.82	.636	2.95	.589	3.16	.572	3.25	.683	df	5.845	.0006
Doctoral GPA	3.47	.636	3.47	.511	3.55	.570	3.41	.795		.6160	.7402
Undergraduate Selectivity	933	166	991	126	929	126	990	109	c	1.663	.1763
Background SES	2.16	.241	2.10	.392	2.02	.326	2.10	.223	f	3.520	.0159
Mother's Education	1.30	.672	1.61	1.02	1.49	.871	1.64	.861		1.645	.1801
Father's Education	1.64	.933	1.60	1.09	1.72	1.03	1.68	1.07		.1429	.9361
Spouse/Partner Education	2.79	.961	2.65	.877	3.43	.838	3.10	.875	acf	5.765	.0010
Mother's Occupation	3.35	.944	2.85	1.19	2.89	1.10	2.94	1.14	bf	3.406	.0186
Father's Occupation	2.34	.782	2.30	.864	1.98	.711	2.18	.750	f	3.323	.0207
Maximum Occupation	2.34	.782	2.30	.864	1.97	.706	2.18	.750	cf	3.560	.0152
Number of Children	2.09	1.38	2.00	1.09	1.98	1.47	1.88	1.26		.1611	.9224
Number of Dependents: Total Group	3.33	1.41	3.20	1.52	3.14	1.36	2.94	1.34		.5358	.6596
Number of Dependents: Single/Widowed/Divorced	2.09	.390	2.22	.441	2.60	1.05	2.42	.786	f	2.695	.0454

*Each letter given denotes a pair of groups significantly different at the .10 level

LSD MEANS	AI(M)	AI(F)	WA(M)	WA(F)
AI(M)	--	a	b	c
AI(F)	a	--	d	e
WA(M)	b	d	--	f
WA(F)	c	e	f	--

(table continues)

Table 1, continued

VARIABLE	MALE				FEMALE				LSD TEST*	F RATIO	F PROBABILITY
	WA		AI		WA		AI				
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD			
Size of Community	5.24	2.19	6.75	2.80	5.61	2.07	3.58	2.15	de	4.220	.0064
Doctoral Degree Progress	4.01	2.10	4.80	2.68	4.16	2.53	5.29	2.61	de	1.696	.1721
Rate Self with Others	1.92	.802	2.00	1.04	2.13	.963	2.11	.696		.8843	.4502
Doctoral Honors Received	.336	.475	.381	.497	.209	.409	.235	.437	f	1.555	.2014
Student/Advisor Gender Similarity	.621	.487	.676	.511	.172	.380	.294	.469	cdf	16.92	.0001
Undergraduate Debt Owed at BA	1.56	.922	1.66	1.01	1.32	.651	1.94	1.51	ef	2.721	.0455
Initial Debt at Doctorate	1.93	1.09	2.09	.943	1.68	.820	2.35	1.32	ce	2.637	.0507
Owe Now: Undergraduate	1.56	.935	1.57	.870	1.23	.533	1.88	1.53	ef	3.491	.0166
Owe Now: Master's	1.57	1.25	1.95	1.46	1.33	.78	1.88	1.83	ce	2.079	.1041
Total Debt Owed	3.10	1.78	3.45	1.70	2.55	1.00	3.76	2.65	cef	3.865	.0099
Doctoral Expense:											
Personal Sources	2.66	1.36	2.47	1.26	2.98	1.38	2.47	1.28		1.293	.2662
Univ. Assistance	2.41	1.32	2.38	1.28	2.13	1.10	2.23	1.30		.7210	.5405

*Each letter given denotes a pair of groups significantly different at the .10 level

LSD MATRIX

	AI(M)	AI(F)	WA(M)	WA(F)
AI(M)	--	a	b	c
AI(F)	a	--	d	e
WA(M)	b	d	--	
WA(F)	c	e	f	--

(table continues)

Table 1, continued

VARIABLE	MALE				FEMALE				LSD TEST*	F RATIO	F PROBABILITY
	MA		AI		MA		AI				
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD			
(Doctoral Expense, continued)											
Doctoral Loans	1.64	.867	1.94	1.39	1.70	.916	1.82	1.26		.5119	.6609
Other Grants	2.05	1.22	2.36	1.46	2.18	1.36	3.05	1.14		2.927	.0351
Employment: Related	1.26	.671	1.57	1.12	1.42	.852	1.29	.469		1.045	.3737
Employment: Not Related	1.87	1.30	1.77	1.11	1.91	1.24	1.58	.919		.3542	.7847
Other Support	1.20	.851	1.38	.869	1.20	.756	1.10	.316		.3513	.7882
Expected Post-Doctorate Salary:	4.12	1.29	3.94	1.22	3.75	1.11	3.52	1.12	df	2.040	.1094

*Each letter given denotes a pair of groups significantly different at the .10 level.

LSD MATRIX

	AI(M)	AI(F)	MA(M)	MA(F)
AI(M)	--	a	b	c
AI(F)	a	--	d	e
MA(M)	b	d	--	f
MA(F)	c	e	f	--

Corollary to their spouse/partner having the highest percentage of advanced degrees (63.4%), the MA(F) subgroup also had fathers with the highest level of professional occupations (25.6%), and the lowest percentage of fathers (24.4%) who were laborers. The LSD comparison test on ANOVA results yielded an $F = 3.323$, $p = .0207$ for father's occupation, with a significant difference between MA(F) and MA(M). The Chi-square statistic for mother's occupation ($df(9) = 13.86$) also resulted in significance ($p = .1270$) with supporting ANOVA results ($F = 3.406$, $p = .0186$). Significant paired differences occurred between MA(F) and MA(M), and between AI(M) and MA(M) subgroups.

A variable was created to reflect highest level of combined (household) parental occupation and designated as "maximum occupation" (Nettles, 1989a). This also resulted in significant ANOVA findings ($F = 3.560$, $p = .0152$) with significant difference between MA(F) and MA(M) subgroups, and between AI(M)s and MA(F)s. All four of these variables (spouse/partner education, father's occupation, mother's occupation, maximum occupation) resulted in significant differences principally delineated along ethnic and gender pairings. Eight significant differences occurred, only one of which was between the two male cohorts; but seven differences between females and males, five of which were between the two MA gender groupings.

Academic Characteristics

Education was the doctoral major of 32.2% of the total group, followed in rank order of major field of study by: Social Science (24.2%), Physical Science (14.7%), Business/ Communication (11.4%), Arts/Humanities (10.0%), and 7.6% for the combined fields of Math/Statistics/Computer Science/Engineering. The Chi-square statistic ($df(15) = 24.94$) on this item was also significant ($p = .0507$).

The subgroup most likely to attend full-time was the AI(F) (at 82.4% for both categories, originally full-time and currently full-time). Not surprisingly, results on degree progress revealed the AI(F) subgroup with the highest mean (5.2, or having completed the general examinations, but not yet admitted to candidacy) on current status in the degree program (Question 23). The F ratio on degree progress was 1.686 with $p = .1711$ with significant differences between the AI(F) and both of the MA cohorts.

Respondents were asked to rate their academic performance in comparison with other doctoral students in their department (Question 41) on the basis of the following five-point ordinal scale: (a) I am one of the top students, (b) I am somewhat above average, (c) I am about average, (d) I am somewhat below average, or (e) I am far below average.

By subgroup, MA(F)s had the highest of the Doctoral Grade Point Averages (DGPAs) at 3.55; however, their self-ratings were lower than the other three subgroups (between response categories b and c). Furthermore, MA(F)s received the least amount of honors or awards at the doctoral level. This trend was carried further in the amount of university grants and assistantships awarded (Question 42). The MA(F)s subgroup was once

again the lowest. ANOVA results for this variable were $F = 2.015$, $p = .1134$ with LSD paired differences revealing significance between the two female subgroups and between AI(F) and MA(M).

Factors Related to Faculty/Advisors/Mentors

Faculty Interaction

Results of the principal components analysis demonstrated that 42.9% of the 21 factors from both extractions--nine individual factors--pertained to satisfaction with faculty, advisors, and mentors. Three of these factors occurred in the first extraction. Factor I (Satisfaction with Faculty/Student Relations) of the first extraction contained 15 different variables relating to satisfaction of these students with their relations with faculty. This factor alone accounted for 29.6% of the total variance, with an eigenvalue of 13.3. Factor V (Faculty Impact) pertained to the impact which a faculty member exerts upon the doctoral student, and contained two loadings of .69 and .51. The final factor of the first extraction (Factor XII) held a loading of .81, making it seventh highest of all 42 loadings associated with factors from the first extraction. The variable as stated in the DSS is:

> Question 4W: White/Anglo faculty on this campus seem to have lower expectations of Mexican American/Latino, American Indian or African American doctoral students than of White/Anglo students

This factor alone bears a chilling message to institutions and mentors of ethnic minority doctoral students: A faculty environment which affirms the unique contribution to the diversity of the department and campus is crucial to the MA and AI doctoral students for them to realize their fullest potential.

View of Advisor and Mentor

The second extraction focused specifically on the relationship between the student and her/his advisor and/or mentor, utilizing 31 variables for the analyses.

Factor I (Student View of Advisor) had five of its six loadings above .80, with the sixth at .75, all describing the student's view of advisor.

Respondents were asked to respond to statements which described their faculty advisor with response categories on a five-point Likert scale of Strongly Disagree to Strongly Agree (Question 8). ANOVA results for this variable yielded an $F = 3.368$ and significance of $p = .0195$.

Also noteworthy, this variable contained more paired differences from the LSD procedure than any other item in the ANOVA. There were significant subgroup differences in perception of advisor as follows: AI(M) to AI(F), AI(M) to MA(M), AI(F) to MA(F),

and MA(F) to MA(M). In all perceptions of advisor the AI(F) subgroup was the most satisfied, either agreeing/strongly agreeing with the following positive statements: (a) is knowledgeable in his/her field, 100%; (b) is accessible, 94.1%; (c) offers useful criticism on my work, 76.5%; (d) has concern for my professional development, 94.2%; (e) demonstrates research excellence, 88.2%; and (f) has concern for me as an individual, 82.3%. At the opposite end of the spectrum, the AI(M) subgroup tended to perceive (30.0%) that their advisors were (a) not accessible, (b) did not offer useful criticism, and (c) did not have concern for their personal development. Twenty-five percent of AI(M)s also felt their advisors did not have concern for them as individuals.

Factor II (Student/Faculty Academic Interaction) consisted of variables of interactions of a professional nature with faculty, with seven factor loadings ranging from .77 to .45.

Factor III (Mentor Selection) had very high loadings, with three of its four factor loadings between -.87 and .84. All items pertained specifically to the mentor relationship. This was the only factor loading of the second extraction which carried a negative statistical value, indicating that if the student felt that she/he located a mentor in a short period of time, then she/he perceived that it took others longer. Conversely, if it took the student a long time to locate a mentor, the student perceived that others found a mentor in much less time.

Results differed widely by ethnicity and gender on having a mentor: Fully 82.4% of AI(F)s had a mentor compared to only 60% of AI(M)s. The AI(F) subgroup also reported locating a mentor in the least amount of time (Question 6): After two years, nearly one-third (31.1%) of MA(F)s still had not located, nor worked with a mentor.

Ethnic/Gender Similarity of Student and Advisor/Mentor

A major interest of this study concerned ethnic minority doctoral student and advisor/mentor ethnicity and gender similarities. For the 21 factors yielded by the Principal Components Factor Analysis (12 factors in the first extraction and 9 in the second), the second extraction contained the two highest individual factor loadings in the study, .94 and .90, respectively, for Student and Advisor/Mentor Gender Similarity (Factor VI) and Student and Advisor/Mentor Ethnic Similarity (Factor V).

In response to each of the four items in Question 5 which asked if the respondent's advisor or mentor was of the same race/ethnicity, or the same gender, the answers strongly supported normative data which show that ethnic minorities and women are severely underrepresented on graduate faculties, or if present on faculties, did not advise these ethnic minority students.

Although nearly one-third (32.2%) of the total cohort did not have a faculty mentor, just 15.8%--only 34 of 214--had a doctoral advisor of the same ethnicity. The corollary

number with a mentor of their own ethnicity was even more dismal: 29 of the 214 (or 13.5%) worked with a mentor of their own ethnic background.

On student/advisor ethnic similarity, ANOVA results showed significant differences (F = 2.386, p = .0701). The Chi-square statistic (df(3) = 6.949, p = .0735) similarly supported the finding. Student/mentor ethnic similarity also showed a significance of p = .0701. The LSD test revealed significant differences between the two male subgroups, as well as between MA(M) and MA(F).

Even stronger results were demonstrated in the category of student and advisor gender similarity. Data from the study revealed that same-sex pairings of doctoral mentor and doctoral student holds high significance for academic satisfaction for these students. ANOVA results on the item of student and advisor/mentor gender similarity were an F ratio = 14.92 and significance of p = .0001. As further corroboration, the Chi-square statistic strongly supported the relationship (df(3) = 54.89, p = .0001). There were also three significant pair-wise differences: MA(F) and AI(M), MA(F) and MA(M), and AI(F) and MA(M), all of which are gender pairings. As further reinforcement of the significance of the student and advisor/mentor ethnic and gender findings, reliability coefficients were calculated on SPSSX for each of the two items. The reliability coefficient on both ethnic and gender similarity items was calculated as .0001.

Analysis of Variance results solidly supported results found with the two items from the second extraction which pertained to student and advisor/mentor ethnic and gender similarity. As can be seen in Table 2, Factor V (Ethnic Similarity) resulted in an F = 2.386, p = .0701 and shows significance in difference in the LSDM between the AI(M) and MA(M) cohorts, and between MA(M) and MA(F). ANOVA results supported the belief that there was an even stronger effect of gender similarity. For Factor VI (Table 2), Student and Advisor/Mentor Gender Similarity, analysis yielded F = 14.92, p = .0001. Also notable in the analysis of Factor VI, were significant differences among three of the paired cohorts: between AI(M) and MA(F), AI(F) and MA(M), and once again between MA(M) and MA(F).

Table 2

Results of One-Way ANOVA for Factors: Part II Extraction

FACTOR		MALE				FEMALE				LSD TEST*	F RATIO	F PROBABILITY
		MA		AI		MA		AI				
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD			
I.	Student View of Advisor	25.41	4.22	22.80	7.68	23.65	5.90	26.76	3.34	aebf	3.368	.0195
II.	Student/Faculty Academic Interaction	13.71	4.89	12.28	4.03	13.58	4.22	14.23	4.53		.7755	.5089
III.	Mentor Selection	7.39	.802	7.36	1.28	7.55	.948	7.18	.750		.4852	.6939
IV.	Student Social Interaction	7.57	2.35	7.85	2.68	7.74	2.55	7.94	2.70		.1637	.9207
V.	Student and Advisor/Mentor Ethnic Similarity	.157	.366	.000	.000	.061	.242	.117	.332	bf	2.386	.0701
VI.	Student and Advisor/Mentor Gender Similarity	.621	.487	.476	.511	.172	.380	.294	.469	cfd	14.92	.0001
VII.	Student and Minority Contact	9.63	2.51	8.66	3.08	9.93	2.66	9.64	2.11	c	1.3292	.2659
VIII.	Student/Faculty Professional Interaction	8.84	2.65	8.80	3.38	8.90	2.75	10.05	3.61		.9288	.4277
IX.	Minority Participation	2.70	.712	2.70	.801	2.62	.621	2.47	.624		.6529	.5820

*Each letter given denotes a pair of groups significantly different at the .10 level.

LSD MATRIX

	AI(M)	AI(F)	MA(M)	MA(F)
AI(M)	--	a	b	c
AI(F)	a	--	d	e
MA(M)	b	d	--	f
MA(F)	c	e	f	--

Implications and Importance of the Study

Implications of these data are straightforward: MA and AI doctoral students can transcend their previous socioeconomic background and academic preparation once they reach the doctoral level. However, support and involvement of the doctoral mentor is critical to that achievement. The MA and AI doctoral student's feeling of belonging can be greatly facilitated or deterred by her/his graduate advisor or mentor. The quality of interaction with the faculty mentor and perceived faculty attitudes is central to the MA and AI student's full incorporation into the academic system, for having a model for one's future professional role, and for ultimate satisfaction within the doctoral experience.

In the present study, the two ethnic cohorts (MA and AI) responded with amazing similarity on all items of the DSS instrument. However, using the Least Significant Differences (LSD) procedure for testing significance within pairs of groups, there were significant within group differences at the .10 level when the two ethnicities were divided by gender. Differences occurred most often as gender differences, rather than ethnicity. In all ANOVA results, the greatest pattern of difference was between MA(M) and MA(F), which occurred as showing significant differences 16 times. The number of times paired combinations of subgroups held significance in second and third rank order were: 11 times for AI(M) and MA(F), and nine times for MA(M) and AI(F). The MA(F) subgroup was also notable by occurring nine times in a "solo" capacity of significance with another group, i.e., no other pairs were in combination on those nine variables.

Women especially reported academic experiences which were impediments to access and equality, had lower academic self-concepts, and perceived that their institution was much more discriminatory than their male counterparts. Although the female cohort excelled academically at both the undergraduate and doctoral levels over the male cohort, they perceived themselves to be less outstanding, and had received less recognition for their achievements at the doctoral level than their ethnic male counterparts. That finding holds special significance to the process of doctoral mentoring. These perceptions were held by both female subgroups, but more strongly by MA(F)s. It has been posited that Hispanic culture has taught MA(F)s to be unassertive (Bernal, 1980). Being unassertive may result in MA(F)s failure to garner deserved recognition in their doctoral program.

Mexican American females of the study had parents with low levels of educational attainment, but if married or partnered, their partners held the highest level (63%) of advanced degrees for all four subgroups. The MA(F) subgroup--whether single or partnered--also held the highest income level and tended to supply a large portion of their own doctoral expenses. Implication of this for the MA(F) subgroup in relation to doctoral satisfaction may be that in order to transcend cultural constraints of attaining the doctorate, the MA(F) subgroup needs to (a) remain single and self-supporting, or (b) marry spouses with advanced degrees with whom they may be more "culturally accepted." Future acculturation analyses may shed light on this possibility.

Most notable, results of the study demonstrated the strong relationship of providing doctoral advisors/mentors, especially of like gender and ethnicity. Respondents' view of their advisor emerged as an individual factor item (Factor I, second extraction). The data showed that the advisors of the MA and AI doctoral students were mostly male W/NHs and that students viewed their advisor as knowledgeable and scholarly in his/her field, helpful in criticism and concern for their professional development, and interested in their welfare as an individual. Nonetheless, these minority students clearly preferred an advisor/mentor of similar ethnicity and gender. Few respondents (13.5%) had a doctoral mentor of the same ethnicity. Data revealed that same-sex pairings of doctoral mentor and doctoral student holds high significance for academic satisfaction. Whereas 97 of the males had a male mentor (almost always a W/NH), only 34 of the females had a mentor of the same gender--nearly a 3:1 difference.

This study concluded that prodigious efforts are needed by these MA and AI doctoral students to achieve their predominant goal of joining an academic faculty (52.2% hold that expectation), with low expectations by W/NH graduate faculty and perceived discrimination presenting significant barriers to doctoral satisfaction. Data from the study support that lack of mentors and faculty concern for MA and AI doctoral students contributes to a sense of isolation, whereas the opportunity to interact with faculty and within the department tends to dispel any perceptions of an inhospitable atmosphere (Williamson, 1991).

Findings from this study indicate that these MA and AI doctoral students were inadequately socialized into their departments (Williamson, 1991). In order to assure the success of its minority doctoral students, institutions must reach beyond graduation. If these doctoral students are to be fully encouraged to pursue academic careers, additional efforts must be made to support the beginning of those careers with postdoctoral assistance. In view of the shortcomings in mentoring for minority doctoral students found in this study, we recommend and propose a postdoctoral program which can compensate for lack of preparation for successful academic careers. Such a commitment requires collaboration among a consortia of institutions, not just the resolve of an individual institution. A regional cooperation could develop institutional agreements for reciprocity. This would guarantee appointment of any other institution's recent minority PhDs to cooperating institutions and would ensure that the minority PhD recipient is fully prepared with necessary research backing from that institution to develop her/his academic skills and future research agenda.

Data from this study are compelling in their support of MA and AI doctoral students having the opportunity to work with ethnic minority faculty, and even more dramatically, with mentors of their own gender. With the impending retirements of over 50% of the professoriate within the next 15 years (Mooney, 1990), universities must make hiring minority and women faculty a major and continuing agenda item for the mission of their institutions. Results from the present study underscore this supposition. Institutions must face their responsibilities in this regard on an even more committed, aggressive level by working to recruit, promote and tenure minority and women faculty.

This study will serve to guide future research in minority doctoral satisfaction and provides a basis for replication at other public research universities. It contributes information that can guide immediate institutional efforts to increase the production of minority doctorates and to encourage their entrance into academic careers. Finally, it will ultimately serve as the basis for development of a theoretical model of minority doctoral satisfaction for Mexican American and American Indian students.

REFERENCES

Adams, H. G. (1988). *Tomorrow's professoriate: Insuring minority participation through talent development today.* Paper presented at the Engineering Dean's Council Student Pipeline Workshop, American Society for Engineering Education, Washington, DC.

American Council on Education. (1987). *Minorities in higher education, fifth annual status report.* Washington, DC: Office of Minority Concerns.

Arce, C. H., and Manning, W. H. (1984). Ford Foundation Report: *Minorities in academic careers: The experiences of Ford Foundation Fellows.* New York, NY.

Astin, H. S. (1969). *The woman doctorate in America.* New York: Russell Sage Foundation.

Berg, H. M., and Ferber, M. A. (1983). Men and women graduate students: Who succeeds and why? *Journal of Higher Education,* 54(6), 629-648.

Bernal, M. E. (1980). Hispanic issues in psychology: Curricula and training. *Hispanic Journal of Behavioral Sciences,* 2(2), 129-146.

Blackwell, J. E. (1983). *Networking and mentoring: A study of cross-generational experiences of Blacks in graduate and professional schools.* Atlanta, GA: Southern Educational Foundation.

Blackwell, J. E. (1987). *Mainstreaming outsiders: The production of Black professionals.* Dix Hills, NY: General Hall, Inc.

Blaska, B. (1976). Women in academe: The need for support groups. *Journal of the National Association of Women Deans, Administrators, and Counselors,* 39(4), 173-177.

Carrington, C. H., and Sedlacek, W. E. (1976). *Attitudes and characteristics of Black graduate students* (CSC-RR-3-76). Cultural Study Center, University of Maryland, College Park: MD.

Chacón, M. A., Cohen, E. G., and Strover, S. (1987). *Chicanas and Chicanos: Barriers to progress in higher education.* Research in Higher Education, 26(1), 296-324.

Clague, M. W. (1990). *Minority doctoral support programs: Three case studies.* University of Maryland: National Center for Postsecondary Governance and Finance.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometricka*, 16, 297-334.

Fries, J. E. (1987). *The American Indian in higher education: 1975-76 to 1984-85.* Washington, DC: National Center for Educational Statistics.

Girves, J. E., and Wemmerus, V. (1988). Developing models of graduate student degree progress. *Journal of Higher Education*, 59(2), 163-189.

Hall, M. L., and Allen, W. R. (1982). Race consciousness and achievement: Two issues in the study of Black graduate/professional students. *Integrated Education*, 20, 56-61.

Hartnett, R. T. (1976). Environments for advanced learning. In J. Katz and R. T. Hartnett (Eds.), *Scholars in the Making* (pp. 49-84). Cambridge, MA: Ballinger Publishing.

Hearn, J. C. (1987). Impacts of undergraduate experiences on aspirations and plans for graduate and professional education. *Research in Higher Education*, 27(2), 119-141.

Holmstrom, E. I., and Holmstrom, R. W. (1974). The plight of the woman doctoral student. *American Educational Research Journal*, 11(1), 1-17.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20, 141-151.

Kjerulff, K. H., and Blood, M. R. (1973). A comparison of communication patterns in male and female graduate students. *Journal of Higher Education*, 44(8), 623-632.

Loo, C. M., and Rolison, G. (1986). Alienation of ethnic minority students at a predominantly White university. *Journal of Higher Education*, 57(1), 58-77.

Mooney, C. J. (1990). Faculty job market slowly improving, evidence indicates. *The Chronicle of Higher Education*, Vol. XXXVI, No. 31.

National Center for Educational Statistics. (1989). *Degrees and other formal awards conferred.* Washington, DC: U.S. Department of Education.

National Center for Educational Statistics. (1990). *Degrees and other formal awards conferred.* Washington, DC: U.S. Department of Education.

National Research Council. (1989). *Summary report 1988: Doctorate recipients from U.S. universities.* Washington, DC: Office of Scientific and Engineering Personnel.

Nettles, M. T. (1989a). *Comparing the backgrounds, educational experiences and outcomes of Black, Hispanic, and White doctoral students* (GRE Report No. 86-22). Princeton, NJ: Educational Testing Service.

Nettles, M. T. (1989b). *Comparing the backgrounds, educational experiences and outcomes of Black, Hispanic, and White doctoral students.* Princeton, NJ: Educational Testing Service.

Nettles, M. T. (1990). *Black, Hispanic, and White doctoral students: Before, during, and after enrolling in graduate school* (research report). Minority Graduate Education Project, Princeton, NJ: Educational Testing Service and Graduate Record Examinations Board.

Nora A., and Rendón, L. I. (1990). *Determinants of predisposition to transfer among community college students: A structural model.* Research in Higher Education, 31(3), 235-255.

Olivas, M. A. (1990, May). Prepared remarks on papers and GRE reports presented by Nettles, Zwick, Brown, Baratz and Snowden. Meeting of the Minority Graduation Education Research Conference, Educational Testing Services, Princeton, NJ.

Pedhazur, E. J. (1982). *Multiple regression in behavioral research, 2nd. ed.* Ft. Worth: Holt, Rinehart and Winston, Inc.

Rice, L. T. (1981). *A profile of the female doctoral student who persisted to the completion of the doctoral degree.* Unpublished dissertation, Auburn University.

Shapiro, E. C., Haseltine, F. P., and Rowe, M. P. (1980). Moving up: Role models, mentors, and the patron system. *Sloan Management Review*, 19, 51-58.

Stevens, J. P. (1986). *Applied multivariate statistics for the social sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Williamson, M. J. (1991). *Mexican American and American Indian student satisfaction with their doctoral programs.* Unpublished doctoral dissertation, Arizona State University, Tempe.